DAILY CURRENT AFFAIRS 22-01-2025

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Mount Ibu

Syllabus: GS-1:World Geography – Volcanoes.

Context:

- Indonesia's Mount Ibu erupted 1,000 times in January 2025.

Location and Recent Activity

- **Mount Ibu**: A volcano located on the remote island of **Halmahera** in eastern Indonesia.
- **Eruption Record**:
  - Total of **1,079 eruptions** recorded since January 1.
  - Columns of ash reached **0.3 km to 4 km** above the peak.
  - Significant eruption on **January 15**, sending ash 4 km into the sky.
  - On **Sunday, January 21**, 17 eruptions were recorded, including a major one at **1:15 a.m. local time**.

About Mount Ibu:

Mount Ibu (Indonesian: Gunung Ibu) is a prominent stratovolcano located on the north-western coast of Halmahera Island, Indonesia. It is part of the Pacific Ocean's "Ring of Fire," a geologically active zone characterized by frequent earthquakes and volcanic activity, containing 127 active volcanoes.

Geographical and Geological Features:

- **Summit and Craters**:
  - The summit is truncated, featuring nested craters.

- The **inner crater** is approximately **1 km (0.62 mi)** in width and **400 m (1,312 ft)** in depth.
- The **outer crater** measures around **1.2 km (0.75 mi)** in width.

- **Parasitic Cones**:
  - A large parasitic cone is situated to the northeast of the summit.
  - A smaller cone to the southwest feeds a lava flow down the volcano's western flank.
- **Maars**:
  - Groups of maars (volcanic craters formed by explosive eruptions) are present on the western and northern sides of the volcano.

American President

Syllabus: GS-2: Comparison of Indian Constitution with USA.

Context:

Donald Trump was sworn in for a historic second term as president.

Key difference between Indian President and USA President:

The Indian Presidential Election and the U.S. Presidential Election are fundamentally different in terms of their processes, composition, and the powers associated with the office. Here's a comparison highlighting the key differences:

1. Electoral College Composition

- **India**: The Electoral College consists of elected Members of Parliament (MPs) and elected Members of Legislative Assemblies (MLAs) from all states and Union Territories of Delhi and Puducherry. The vote value varies among MPs and MLAs based on a formula reflecting state populations.
- **U.S.**: The Electoral College comprises electors chosen by the states, with each state allocated electors based on its Congressional representation (Senators + Representatives). All citizens vote for electors, who then cast votes for the president.

2. Nomination Process

- **India**: Candidates require support from at least 50 proposers and 50 seconders from the Electoral College.

- **U.S.**: Candidates are typically nominated by political parties through primary elections and national conventions.

3. Voting Process

- **India**: Electoral College members cast preferential votes, ranking candidates in order of preference.
- **U.S.**: Citizens vote directly for electors in a winner-takes-all system (except in Maine and Nebraska), and electors then vote for the president.

4. Vote Value Calculation

- **India**: Votes have different values:
  - MP's vote: Fixed at 700.
  - MLA's vote: Calculated based on the population of the state divided by the number of MLAs and then divided by 1,000.
- **U.S.**: Each elector's vote holds equal weight in the final Electoral College tally.

5. Winning Quota

- **India**: The candidate must secure more than 50% of the total vote value to win.
- **U.S.**: A candidate needs a majority of Electoral College votes (270 out of 538).

6. Term Duration

- **India**: Five-year term; eligible for unlimited re-election.
- **U.S.**: Four-year term; limited to two terms (eight years).

7. Powers and Functioning

Aspect	Indian President	U.S. President
Powers	Primarily ceremonial; real power rests with the Prime Minister and the Council of Ministers.	Significant executive authority, acting as both head of state and head of government.
Executive Role	Acts on the advice of the Council of Ministers.	Exercises independent authority, including issuing executive orders and directing the federal government.
Impeachment	Can be impeached for constitutional violations; requires a two-thirds majority in both houses.	Can be impeached for treason, bribery, or high crimes; initiated by the House and decided by the Senate.

8. Privileges and Immunities

- **India**: Immune from legal proceedings for actions taken in official capacity but not for personal actions.
- **U.S.**: Enjoys broader privileges, including executive privilege, but can be held accountable for illegal activities post-presidency.

9. Political Affiliation

- **India**: Though usually affiliated with a political party, the president is expected to act impartially.
- **U.S.**: Represents a political party and actively engages in partisan politics.

Constitutional Provisions for Indian President

- **Article 54**: Election of the President.
- **Article 55**: Manner of election.
- **Article 56**: Term of office.
- **Article 57**: Eligibility for re-election.
- **Article 58**: Qualifications.

Conclusion:

While both presidents serve as the ceremonial head of state, their roles, powers, and methods of election reflect the distinct political systems of their countries—parliamentary democracy in India and a federal presidential system in the U.S.

UGC's draft regulation has serious Constitutional issues

Syllabus: GS-2: Center-state issues.

Context:

- The draft regulation by the University Grants Commission (UGC) on the selection and appointment of vice chancellors of universities has evoked protests by non-Bharatiya Janata Party-headed State governments.

Key Provisions of the Draft Regulation

- **Amendment to Regulation 2010**:
  - Expands eligibility criteria for vice chancellors.
  - Includes professionals with 10+ years of experience in industry, public administration, or public policy, alongside academicians with 10 years of professorial experience.

- **Objective of the Amendment**:
  - Broaden the selection pool for vice chancellors.

Constitutional and Legal Issues

Objective of the UGC Act

- Enacted in 1956 for the **coordination and determination of standards** in universities.
- Mandates the UGC to:
  - Promote and coordinate university education.
  - Maintain standards in teaching, examination, and research.
  - Allocate funds to universities for development.
- Section 26 empowers the UGC to make regulations but restricts them to the scope of the Act.

Jurisdictional Overreach of UGC

- The Act does not address the selection or appointment of vice chancellors.
- Bombay High Court ruling (2011):
  - Selection and qualifications of vice chancellors do not have a **direct impact on education standards**.
- Constitutional concern: UGC's attempt to regulate beyond its legislative mandate.

State vs. Central Authority

- **Bombay High Court in Suresh Patilkhede case (2011)**:
  - UGC Regulations, being subordinate legislation, cannot override a State law.
- **Supreme Court in Kalyani Mathivanan case (2015)**:
  - UGC regulations hold binding authority on universities but are recommendatory for State universities and colleges.

Federal Implications

- Article 254 of the Constitution:
  - Addresses conflicts between State laws and Central laws.
  - Central legislation overrides State laws only when:
    - Passed by both Houses of Parliament.
    - Assented to by the President.

- Subordinate legislation, such as UGC regulations, does not override State laws.

Key Court Observations

- **Kalyani Mathivanan case (2015)**:
  - UGC regulations are binding but recommendatory for State universities.
- **Regulatory limits**:
  - Parliament does not formally approve subordinate legislation; regulations can be amended post-laying before the Parliament.

Conclusion

- The controversy underscores the tension between federal principles and central regulation.
- While UGC regulations aim to ensure uniformity and standards, they must operate within the limits of the parent Act and respect State autonomy.
- A balanced approach is necessary to address both constitutional concerns and the need for academic excellence in higher education institutions.

Indian cryptography research gears up to face the quantum challenge

Syllabus: GS-3: Science and Technology – Cryptography.

Context:

Fundamental research in cryptography that's used worldwide to facilitate internet banking, e-commerce services, and secure messaging systems is now taking root in India as well.

Introduction to Cryptography

- **Definition**: Cryptography involves techniques to secure information by converting plain text into ciphertext, ensuring that only authorized parties can access the information.
- **Historical Roots**:
  - Ancient Mesopotamians used cryptic formulae on clay tablets.
  - Julius Caesar used the Caesar cipher to communicate with generals.
  - Polish codebreakers and Alan Turing played key roles in cracking Germany's Enigma cryptosystem during WWII.

- **Modern Importance**: Cryptography underpins internet banking, e-commerce, secure messaging, and more.

Objectives of Cryptography

- **Security Goals**:
  - **Confidentiality**: Ensures that information is accessible only to intended recipients.
  - **Integrity**: Maintains data accuracy and prevents unauthorized alterations.
  - **Authenticity**: Verifies the sender's identity.
  - **Non-repudiation**: Prevents denial of sent/received messages.

Core Concepts

- **Cryptographic Algorithms**:
  - Convert messages into forms difficult or expensive to decode.
  - Relies on "hard" problems that are computationally intensive to solve.
- **Key Systems**:
  - **Symmetric Key**: Single key for encryption and decryption.
  - **Asymmetric Key**: Utilizes a public and private key pair for secure communication.
  - Example: Public-key cryptography, essential for secure internet communication.
- **One-Way Functions**:
  - Functions that are simple to compute but hard to reverse without a key.
  - Used for encryption and in systems like blockchain (e.g., Bitcoin mining).

Modern Developments in Cryptography

- **Post-Quantum Cryptography**:
  - Aims to create cryptosystems resistant to quantum computer attacks.
  - Combines mathematical complexity with quantum physics principles.
- **Homomorphic Encryption**:
  - Allows computations on encrypted data without decrypting it.
  - Useful for preserving privacy in sensitive data processing.
- **Random Number Generation**:

- Indian researchers have developed methods for true random numbers to enhance encryption.

Cryptography Research in India

- **Key Institutions**:
  - IISc Bengaluru, Raman Research Institute, IISER Pune, and others.
- **National Quantum Mission (2023)**:
  - Focus on secure quantum communication over long distances.
  - Plans for ultra-secure quantum satellites.
- **Government Support**:
  - Funded by the Ministry of Science & Technology, Ministry of Electronics and Information Technology, and the Department of Telecommunications.

Challenges in Cryptography

- **Quantum Computing Threats**:
  - Quantum computers can break current cryptographic algorithms.
  - Need for developing quantum-resistant cryptosystems.
- **Data Breaches**:
  - Growing volume of sensitive data in cloud storage.
  - Reports indicate widespread inadequate encryption practices.
- **Slow Advancement**:
  - Cryptography progresses cautiously due to the high stakes of failure.

Future Directions

- **Emerging Research Areas**:
  - Communication complexity.
  - Proof complexity.
  - Algebraic coding theory.
- **Policy Implications**:
  - Increased focus on encryption techniques for cloud-based sensitive data.
  - Developing robust cryptographic frameworks to prevent cyber threats.

Key Takeaways

- Cryptography is a critical field combining mathematics, computing, and security.
- India's growing research capabilities in quantum cryptography signal its intent to lead in future-proof secure communication technologies.
- The interplay between computational advancements and cryptographic security will remain pivotal in addressing emerging cyber challenges.

Godda Project

Syllabus: GS-3: Energy Infrastructure.

Context:

- The **1600 MW Ultra Super-Critical Thermal Power Plant (USCTPP)** at Godda, Jharkhand, is a landmark project in India's energy sector.
- As the first **transnational power project**, it highlights India's growing regional influence and its role in supporting the energy needs of neighboring countries like Bangladesh.

Key Highlights of the Project:

- **Capacity and Supply**: The plant has a capacity of 1600 MW, and 100% of the power generated is exported to Bangladesh, making it a unique initiative.
- **Technological Advancements**:
  - **Flue Gas Desulphurization (FGD)**: Reduces sulfur dioxide emissions significantly.
  - **Selective Catalytic Reconverter**: Ensures reduction of nitrogen oxide emissions.
  - **Zero Water Discharge**: Promotes sustainable water usage, minimizing environmental impact.
- **Ultra Super-Critical Technology**: Ensures higher efficiency and lower emissions compared to conventional power plants.

Significance:

- **Energy Diplomacy**: Strengthens bilateral ties between India and Bangladesh, showcasing India's commitment to regional development.
- **Sustainability Focus**: Incorporates cutting-edge technologies for environmentally responsible operations.
- **Regional Development**: Positions Godda as a hub for energy production and trade.

About Godda:

- **Geography**: Known for its scenic hills and small forests, Godda offers a blend of natural beauty and industrial significance.
- **Rajmahal Coalfield**: Located in Lalmatia, this coalfield is part of Eastern Coalfields Limited (ECL) and is one of the largest in Asia. It plays a critical role in supporting the region's energy projects, including the USCTPP.